between the amount added from the burette and an arbitrary volume contained between two marks on the neck of the flask.

Drawing out the liquid to the zero mark by a pipette enables one to make another and several successive determinations without cleaning out the apparatus until the flask is actually almost filled with the powdered cement, so that three or four determinations may be made in about ten minutes.

Messrs. Peckham's paper recommended the deflagration method for determining sulphur in bitumens, using about two parts bitumen to thirty parts of mixed sodium carbonate and potassium nitrate. Some discussion followed as to the possible loss of volatile sulphur compounds—mercaptans, mercaptids and sulpho ethers—but the amounts of these forms of sulphur were conceded to be extremely small and probably without appreciable effect on the behavior of an asphalt.

A report by the Committee on Patent Legislation was read by Major C. C. Parsons, with the recommendation that it should be brought before the members of the Society at large.

A report by Durand Woodman, Secretary and Treasurer, stated that nine regular and two special meetings had been held, at which thirty-seven papers were read. The average attendance at these meetings was sixty-five.

The expenses of the Section had been $1.19 per member for the year. The membership numbers about 305.

The election of officers for the ensuing year resulted as follows : Chairman, C. F. McKenna ; Secretary-Treasurer, Durand Woodman ; Executive Committee, William McMurtrie, E. G. Love, G. C. Stone ; delegates to the Scientific Alliance, E. E. Smith, M. T. Bogert.

A SPECIAL meeting of the Society was held on Saturday, May 27th, at 8:45 p. m., in the Assembly Room of the Chemists' Club.

Announcement was made by Dr. C. A. Doremus of the preliminary program of the Fourth International Congress of Applied Chemistry, to be held at Paris next year. The meetings will be held in the halls and amphitheatre of the new Sorbonne, and every important branch of applied chemistry will be covered.

The feature of the evening was a paper by Dr. H. W. Wiley on 'The Chemistry of Nitrification,' fully illustrated by lantern slides.

DURAND WOODMAN,
Secretary.

THE WASHINGTON BOTANICAL CLUB.

REGULAR meetings of the Club were held on May 3 and May 30, 1899. At the former the members participated in a symposium on the topic 'The Origin of Insular Floras.' Discussion was opened by Professor E. L. Greene, Dr. F. H. Knowlton and Mr. O. F. Cook. In the short notes which preceded attention was called to the discovery of *Asplenium ebenoides* in the District of Columbia, and proof sheets of Professor Bailey's 'New Encyclopædia of Horticulture' were exhibited.

The meeting of May 30th was devoted to a discussion of the more salient features of the District flora, several specimens being exhibited. The Club held a most enjoyable excursion on Decoration Day, to which other botanists were freely invited, visiting Plummer's Island, in the Potomac, and the neighboring Virginia shore.

CHARLES LOUIS POLLARD,
Secretary.

PROFESSOR DEWAR ON LIQUID HYDROGEN.

THE second lecture in connection with the Royal Institution's centenary was given by Professor Dewar on June 7th. Professor Dewar said, according to the report in the London *Times*, that he did not intend to take any long flight into the great work of the Royal Institution in the past, since that had already been done by his colleague. His object was rather to introduce his audience to a new instrument of research—that was to say, to liquid hydrogen. This he exhibited boiling gently in a vacuum tube immersed in liquid air, the access of heat being, by this precaution, greatly impeded. They would notice it was a transparent liquid, in which there appeared a whitish deposit. This consisted of solid air, and it was impossible to avoid its presence, because immediately the cotton-wool plug was removed from a vessel of liquid hydrogen the air of the atmosphere came under the influence of so low a temperature as to be at once frozen

solid. To prove that the liquid he was manipulating with such freedom was really liquid hydrogen Professor Dewar put a light to a small quantity, a brilliant burst of flame being the prompt result. Of its exceedingly small density he gave an idea by showing that a light material like cork would not float on its surface, but sank to the bottom as if it were lead. The lowness of its temperature he illustrated by a number of experiments. Thus a solid body immersed in it for a short time was shown to become so cold that the air round it was liquefied and ran off in drops, while when a tube containing liquid air was plunged into it the air immediately became solid. On this tube being lifted out again a double effect was seen, for the melting of the solid within it yielded liquid air, which was also formed by condensation on its outside surface. An empty vessel placed for a short time in the cold atmosphere just above this liquid, filled with solid air in the form of snow, soon melted into liquid. Oxygen in a sealed tube when lowered into it quickly became solid, and when lifted out it could be seen, as heat was absorbed, to assume first the liquid and then the gaseous form. A sponge of porous material, soaked in liquid hydrogen and brought into a magnetic field, apparently behaved as if it were magnetic. That, however was due to the condensation of the oxygen of the air, which, of course, was magnetic, and, though an observer might in this way be easily deceived into thinking hydrogen magnetic, Professor Dewar said he was satisfied that it was nearly neutral or diamagnetic.

Speaking of the real temperature of this liquid, he said it had taken him nearly a year to come to a definite conclusion on that point because he could not get any two thermometers to agree. Pure platinum resistance thermometers gave 35° absolute (or 238° below zero Centigrade), one of the platinum-rhodium alloy 27°, while hydrogen itself in a gas thermometer gave 21°, a reading nearly identical with one obtained with a German-silver electrical thermometer. The last part of the lecture was devoted to the extraordinarily low vacua obtainable by the use of liquid hydrogen. Thus, by immersing one end of a closed tube in it for a short time and then sealing it off in the middle, a vacuum was formed in the upper part which was substantially perfect, as was shown by the fact that the electrical charge could not be made to pass. In conclusion, Professor Dewar, after exhibiting several other beautiful experiments, including one to illustrate the rapidity with which gases were discharged into a vacuum, claimed that the liquefaction of hydrogen was a triumph for theory not less than for practice.

Lord Kelvin, in moving a vote of thanks to Professor Dewar for his brilliant, beautiful and splendidly interesting lecture, said that if those present wished to measure the importance of the occasion, let them think what Count Rumford, or Davy, or Faraday would have thought, could they have been present. They could not have hoped for their scientific dreams and prophecies to be so splendidly verified within the century. The end of experiment in research at low temperatures had by no means been reached, and perhaps in a few years substances yet unknown and more refractory than hydrogen would have been found which would bring the experimenter to within five degrees of the absolute zero.

AUTOMATIC SHIP-PROPULSION.

AUTOMATIC ship-propulsion is once more proposed, this time by M. Linden, Secretary of the Naples Zoological Station, according to Sr. Menard in *Cosmos* of December 17, 1898. He attaches elastic plates to the bow and stern of the boat, which act precisely as does the tail of a fish. They are bent by the pitching of the boat in a seaway, and the reaction of their forcible unbending, as well as that of their motion against the water while being bent, produces forward motion in the boat, in effect as the fish drives himself forward by springing its tail in lateral movements. Thus every motion of the boat on the surface of the waves produces greater or less acceleration.

The boat employed is stated to be four meters (13 feet) long, its driving plates 50 centimeters long (20 inches) and one-half that width. They are thicker at the point of support than toward their extremities, giving a proper flexure when pressed by the water into their impelling